CLAIMS

What is claimed is:

1. A method of trimming a mesh representation of an object surface comprising a plurality of tessellated polygons, each having vertices, comprising the following steps:

removing from the mesh representation polygons within or intersecting a projection of a trim curve on the mesh representation;

attaching the mesh representation to the projection of the trim curve by introducing polygons into the mesh representation with boundary vertices thereof located on the trim curve projection;

determining detail data for one or more vertices of the mesh representation, the detail data for a vertex representing detail information about the object surface at or about a point corresponding to the vertex; and

applying the detail data to refine the locations of the corresponding vertices of the mesh representation.

2. The method of claim 1 further comprising iteratively subdividing polygons near the trim curve while maintaining boundary vertices thereof on the trim curve projection, and performing the determining and applying steps until the mesh representation is within a prescribed tolerance of the object surface.

3. The method of claim 1 further comprising subdividing the mesh representation prior to the removing step.

4. The method of claim 1 wherein the mesh representation has a limit surface, and the detail data for a vertex relates to the shape of the limit surface at or about a point corresponding to the vertex.

5. The method of claim 4 wherein the point corresponding to the vertex is the limit point of that vertex on the limit surface.

6. The method of claim 4 wherein the point corresponding to the vertex has a closest point relationship to the vertex.

7. The method of claim 4 wherein the point corresponding to the vertex is determined through the following substeps:

determining a corresponding vertex on a first mesh representation derived from the trimmed representation without regard to the detail data thereof;

determining a limit point of that vertex on the limit surface of the first mesh representation;

determining a first point on the limit surface of a second mesh representation derived from the original mesh representation without regard to detail data thereof, wherein the first point bears a closest point relationship to the limit point; and

determining a second point on the limit surface of the original mesh representation which corresponds to the first point.

8. A method of trimming a mesh representation of an object surface comprising a plurality of tessellated polygons, each having vertices, comprising the following steps:

removing from the mesh representation polygons within or intersecting a projection of a trim curve on the mesh representation;

attaching the mesh representation to the projection of the trim curve by introducing polygons into the mesh representation with at least some vertices thereof located on the trim curve projection;

determining detail data for one or more vertices of the mesh representation, the detail data for a vertex representing detail information about the object surface at or about a point corresponding to the vertex;

applying the detail data to refine the locations of the corresponding vertices of the mesh representation; and

iteratively (1) subdividing any polygons near the trim curve which are determined to represent the object surface outside a prescribed tolerance while maintaining boundary vertices thereof on the trim curve projection, and (2) performing the determining and applying steps until the trimmed mesh representation is within a prescribed tolerance of the object surface.

9. A trimmed mesh representation of an object surface which results from performing any of the methods of claims 1 and 8.

10. A trimmed mesh representation of an object surface comprising:

a mesh of polygons defining a representation of a surface which is within a prescribed tolerance of the object surface; and

a projection of a trim curve defining a trim area on the mesh, wherein boundary vertices of polygons located near the trim curve lie on the trim curve projection.

11. The trimmed mesh representation of claim 10 wherein the mesh of polygons comprises a mesh of subdivided or repeatedly subdivided polygons.

12. A processor readable medium tangibly embodying any of the methods of claims 1 or 8.

13. A memory tangibly embodying any of the methods of claims 1 or 8.

14. A processor readable medium which tangibly embodies any of the trimmed mesh representations of claims 9, 10 and 11.

15. A memory which tangibly embodies any of the trimmed mesh representations of claims 9, 10, and 11.

16. A system comprising:

the processor readable medium of any of claims 12 or 14; and

a processor configured to access and perform the method tangibly embodied by the processor readable medium.

17. A system comprising:

the processor readable medium of any of claims 12 or 14; and

a processor configured to access the trimmed mesh representation tangibly embodied by the processor readable medium.

18. A system comprising:

a server; and

a client configured to access the server over a network,

wherein either the client or the server tangibly embodies any of the methods of claims 1 or 8.

19. The system of claim 18 wherein the network is the Internet.

20. A system comprisng:

a server; and

a client configured to access the server over a network,

wherein either the client or the server tangibly embodies any of the trimmed mesh representations of claims 9, 10 and 11.

21. The system of claim 20 wherein the network is the Internet.

22. A method of trimming a mesh representation of an object surface comprising a plurality of tessellated polygons, each having vertices, comprising the following steps:

a step for removing from the mesh representation polygons within or intersecting a projection of a trim curve on the mesh representation;

a step for attaching the mesh representation to the projection of the trim curve by introducing polygons into the mesh representation with boundary vertices thereof located on the trim curve projection;

a step for determining detail data for one or more vertices of the mesh representation, the detail data for a vertex representing detail information about the object surface at about a point corresponding to the vertex; and

a step for applying the detail data to refine the locations of the corresponding vertices of the mesh representation.

23. The method of claim 22 further comprising:

a step for iteratively (1) subdividing any polygons near the trim curve which are determined to represent the object surface outside a prescribed tolerance while maintaining boundary vertices thereof on the trim curve projection, and (2) performing the determining and applying steps until the trimmed mesh representation is within a prescribed tolerance of the object surface.

24. A trimmed mesh representation of an object surface comprising:

mesh representation means for representing the object surface through a mesh of polygons; and

projection means for representing a projection of a trim curve defining a trim area on the mesh representation means.

25. A system comprising:

medium means for tangibly embodying any of the methods of claims 22 and 23; and

processor means for performing any of the methods tangibly embodied by the medium means.

26. A system comprising:

medium means for tangibly embodying the trimmed mesh representation of claim 24; and

processor means for accessing the trimmed mesh representation tangibly embodied by the medium means.